

PATENT COOPERATION TREATY

PCT


INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 05 MAR 2008

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Applicant's or agent's file reference PD030048		FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/EP2004/004406		International filing date (day/month/year) 27.04.2004	Priority date (day/month/year) 16.05.2003	
International Patent Classification (IPC) or national classification and IPC G11B20/14, G11B20/10, G11B27/30				
Applicant DEUTSCHE THOMSON-BRANDT GMBH et al				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 5 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
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Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer Sucher, R Telephone No. +49 89 2399-2148		



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2004/004406

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-9 as originally filed

Claims, Numbers

1-16 received on 12.03.2005 with letter of 08.03.2005

Drawings, Sheets

1/3-3/3 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2004/004406

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-16
	No: Claims	
Inventive step (IS)	Yes: Claims	1-16
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-16
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following documents:

- D1: PATENT ABSTRACTS OF JAPAN vol. 2002, no. 12, 12 December 2002 & JP 2002 216424 A (RICOH CO LTD), 2 August 2002;
- D2: EP-A-1 150 291 (SONY CORP) 31 October 2001;
- D3: PATENT ABSTRACTS OF JAPAN vol. 2000, no. 26, 1 July 2002 & JP 2001 266493 A (SONY CORP), 28 September 2001.

2. Claim 1 defines to convert the sampled signal into a converted signal which represents data at the channel bit clock. However, the claim does not define how information about the channel bit clock is generated. It is clear from the description in conjunction with fig. 2 that it is essential to the definition of the invention that the channel bit clock is calculated from the analysis information and/or the distance information as defined in claim 2, cf. also claim 11. Since independent claim 1 does not contain this feature it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

3. Document D1 discloses (see in particular par. 0025-0032 in conjunction with figs. 5 and 6) a method for data recovery from a time-continuous signal having a specific channel bit clock and a sync pattern occurring at regular intervals, comprising

- sampling the time-continuous signal at a frequency higher than the channel bit clock (A/D conversion section 11, oscillator 12),
- analysing the sampled signal to locate occurrences of one or more of the sync patterns, thereby making available, as an analysis information, where in the sampled signal the sync patterns are located (synchronizing signal detecting section 14),
- calculating from the analysis information a distance information about the distance between consecutive locations of sync patterns (synchronizing signal period calculation section 17),
- calculating from the distance information the channel bit clock (data period

calculation section 15), and

converting the sampled signal into a converted signal which represents the data at the channel bit clock (data extraction section 16).

From this, the subject-matter of claim 1 differs by recognizing the signal format to which the signal complies from the analysis information and the distance information.

Documents D2 and D3 disclose to discriminate the kind of the optical disk from the pattern of the synchronizing signal detected from the reproduced signal. Since none of the prior art documents suggests to detect the signal format corresponding to the kind of the disk from the location and the distance of consecutive sync patterns, the subject-matter of claim 1 appears to involve an inventive step in the sense of Article 33(3) PCT.

4. Claim 11 only comprises functional apparatus features corresponding to the method features according to claim 1. Consequently, the statement made with respect to claim 1 is also valid for claim 11.
5. Claims 2-10 and 12-16 are dependent on claims 1 and 11, respectively, and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VII

Certain defects in the international application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in document D1 is not mentioned in the description, nor is this document identified therein.

Re Item VIII

Certain observations on the international application

see item V above.

REPLACEMENT SHEET 1

for 11.02.2005

Claims

1. A method for data recovery from a time-continuous signal compliant to one or more digital signal formats each having a specific channel bit clock and a sync pattern occurring in regular intervals, the method being **characterised** by the following steps:
- sampling (21, 301, 41) the time-continuous signal at a frequency at least as high as the maximum of all frequencies of the channel bit clocks of the digital signal formats;
 - analysing (25, 310, 45) the sampled signal to locate occurrences of one or more of the sync patterns, thereby making available, as an analysis information, where in the sampled signal which ones of the sync patterns are located;
 - calculating from the analysis information a distance information about the distance between consecutive locations of sync patterns;
 - recognising, from the analysis information and the distance information, the signal format to which the signal complies,
 - converting (23, 26, 303, 304, 306, 309, 311, 43, 46) the sampled signal into a converted signal which represents the data at the channel bit clock.
2. The method of Claim 1, where the step of converting includes the following steps:
- calculating (26, 311, 46) from the analysis information and/or the distance information a channel bit rate and/or the channel bit clock, and
 - converting (23, 303, 306, 309, 43) the sampled signal to the sampling rate defined by the calculated channel bit rate or bit clock.

REPLACEMENT SHEET 2

3. The method of Claim 1 or 2, additionally including the following step:
- after analysing the sampled signal, providing for further use as frame alignment information the locations where sync patterns have been located.
4. The method of Claim 2, additionally including the following step:
- after locating a sync pattern occurrence, decoding (47) from a second signal an address information contained therein,
5. The method of any of Claims 1 to 4, where the step of analysing (25, 310, 45) employs a cross-correlation.
6. The method of Claim 1, additionally including any one or more of the following steps:
- analysing (25, 310, 45), after recognizing the format to which the signal complies, with an algorithm that depends on the recognized format, the sampled signal to locate occurrences of one or more predefined sync patterns, thereby making available analysis information about where in the sampled signal which ones of the sync patterns are located;
 - calculating, with an algorithm that depends on the recognized format, from the analysis information a distance information about the distance between consecutive locations of sync patterns;
 - calculating (26, 311, 46), with an algorithm that depends on the recognized format, from the analysis information and/or the distance information a channel bit rate and/or the channel bit clock;
 - converting (23, 303, 306, 309, 43), with an algorithm that depends on the recognized format, the sampled signal to the sampling rate defined by the calculated channel bit rate or bit clock..

REPLACEMENT SHEET 3

7. The method of Claim 4, where the sampled signal or a sample rate converted sampled signal is used as the second signal.
- 5 8. The method of Claim 4, where a maximum likelihood decoder is applied for the decoding (47) step.
9. The method of Claim 1, where the analysing (25, 310, 10 45) step involves the following sub-steps
- a) setting as a current sync pattern a first sync pattern from a finite set of different sync patterns,
 - b) analysing the sampled signal to find positions of the current sync pattern,
 - 15 c) if no positions are being found and the last sync pattern in the set has not been reached, setting as the current sync pattern the next sync pattern from the set and looping back to sub-step b).
- 20 10. The method of Claim 9, where the analysing sub-step b) involves the following sub-steps
- b1) setting as a current sync pattern version a first stretched version from a finite set of differently stretched versions of the current sync pattern,
 - 25 b2) analysing the sampled signal to find positions of the current sync pattern version,
 - b3) if no positions are being found and the last current sync pattern version has not been reached, setting as the current sync pattern version the next sync pattern version from the set and looping back to sub-step b2).
- 30 11. An apparatus for recovering a channel bit clock from a time-continuous signal compliant to one or more digital signal formats each having a specific channel bit clock and a specific framing structure including a sync
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REPLACEMENT SHEET 4

pattern occurring in regular intervals, the apparatus including

- sampling means (21, 301, 41) which generate a sampled signal from the time-continuous signal,
- 5 - analogue to digital conversion means (21, 301, 41) connected to the sampling means (21, 301, 41) and
- sample rate conversion means (23, 303, 306, 309, 43);

the apparatus **characterised** by

- an analyser (25, 310, 45) adapted to analyse the
- 10 sampled signal to locate occurrences of one or more of the sync patterns,
- a calculator (26, 311, 46) adapted to calculate a channel bit rate and/or the channel bit clock from the locations where sync patterns are located, and
- 15 - a format recogniser (25, 310, 45) adapted to recognise, from the analysis information and the distance information, the signal format to which the signal complies,

wherein the sample rate conversion means (23, 303, 306, 20 309, 43) convert its input data to output data obeying an output sample rate equal to the channel bit rate or bit clock as calculated by the calculator.

- 25 12. The apparatus of Claim 11, where the sample rate conversion means includes two or more units (302, 303, 305, 306, 308, 309) working in parallel, each consisting of a storage means (302, 305, 308) and an associated interpolation means (303, 306, 309).

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13. The apparatus of Claim 11 or 12, additionally including a sync ID decoder (47) triggered by the analyser (45) having located a sync pattern occurrence, the sync ID decoder (47) decoding the sync IDs from the sample rate
- 35 converted digitised signal.

REPLACEMENT SHEET 5

14. The apparatus of Claim 11 or 12, where the analyser
(25, 310, 45) includes a sync pattern selector for
selecting as current sync pattern one sync pattern from
a finite set of different sync patterns and a loop back
5 controller for looping back to an analysing step
whenever for a certain current sync pattern no
occurrences have been found.
15. The method of any of Claims 1 to 10 or the apparatus of
10 any of Claims 11 to 14, where the time-continuous
signal is a readout signal from a digital storage
medium.
16. The method of any of Claims 1 to 10 or the apparatus of
15 any of Claims 11 to 14, where the time-continuous
signal is a received signal from a digital
transmission.